Carcass Disposal Risks

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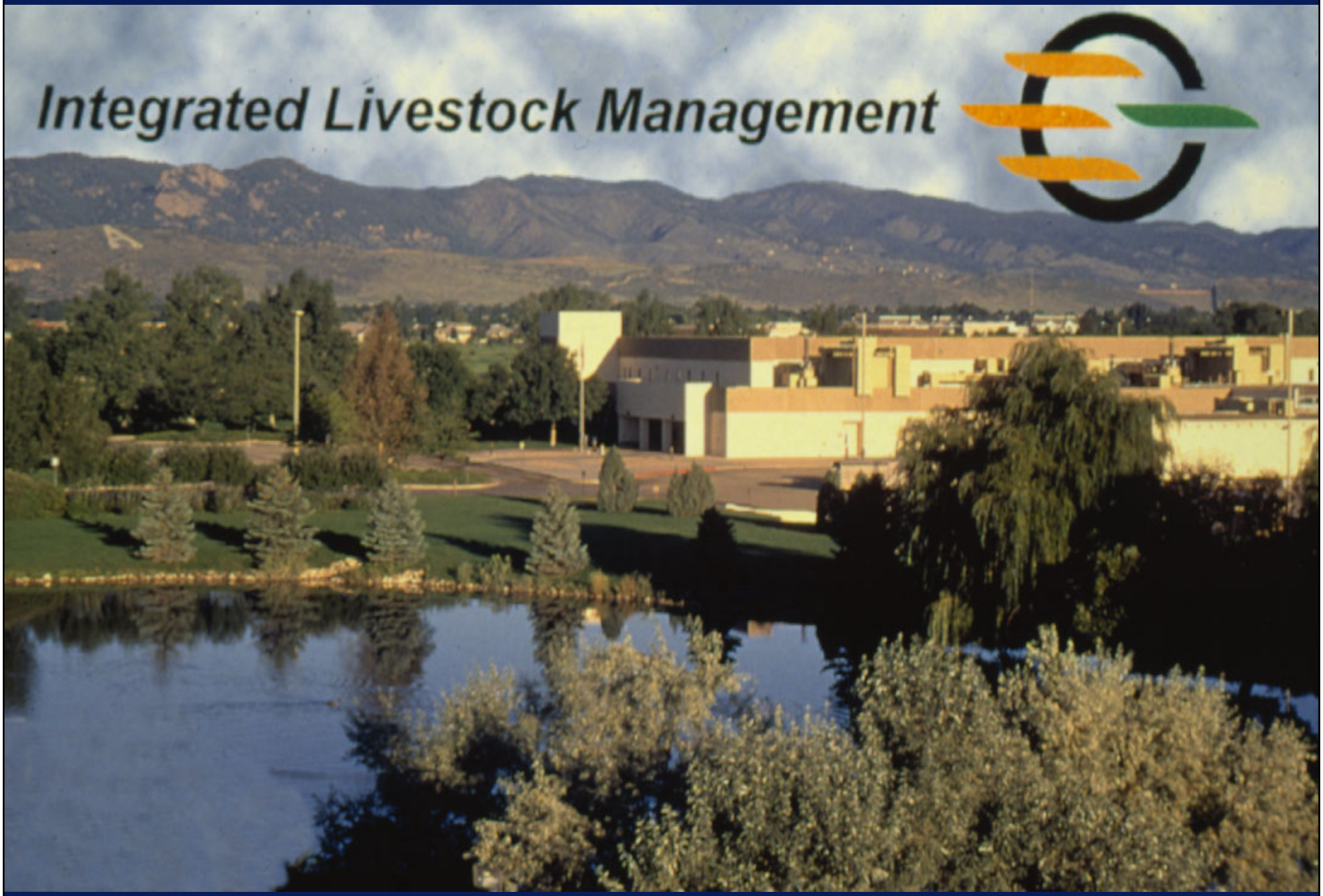

Integrated Livestock Management

What is the magnitude of livestock death losses in Colorado?

Livestock Mortalities

Feedlot cattle	1.4%
Beef cattle	1.5%
Dairy cattle	3.8%
Adult Sheep	5.0%
Feedlot lambs	2.2%
Breeding Swine	3.3%
Horses	2%

USDA:APHIS:VS:NAHMS

Livestock Inventory
Colorado 2001

Feedlot cattle	1,000,000
Beef cattle	840,000
Dairy cattle	90,000
Sheep, lambs	420,000
Swine	840,000
Horses	?
Chickens	4,000,000

USDA:APHIS:VS:NAHMS

What causes livestock death losses?

Unweaned dairy calf deaths

Total deaths	10.8%

Percent of deaths	
Scours/diarrhea	60.5%
Respiratory	24.5%
Other known	6.4%
Unknown	6.3%

1997 USDA:APHIS:VS:NAHMS
Dairy ’96 Study

Unweaned beef calf mortality

Total deaths	5.5%
Percent of deaths	
Digestive	16.7%
Respiratory	8.8%
Weather	9.0%
Calving	33.0%
Other known	7.4%
Unknown	19.1%

Why and how would dead animals represent a risk?

Risks from carcasses

- Transfer of disease problems
  - Humans
  - Animals – livestock, wildlife, pets
- Maintenance of disease in populations
- Contamination
  - Environment
  - Water

Risks from carcasses

- Bacteria
- Viruses/ protozoa
- Fungal agents
- Prions
- Chemicals/toxins
- Bioterrorism?

Infectious disease

- Antibiotic residues
- Food safety
- Zoonotic concerns
- Environmental issues

Bacteria of Concern

- Anthrax
- Clostridial organisms
- Salmonella spp.
- E. coli O157:H7
- Listeria monocytogenes
- Campylobacter jejuni

Bacillus anthracis

- Anthrax
- Extremely resistant spores
- More prevalent in some areas
- Commonly fatal

Salmonella

- 2300 serotypes; many are shared between humans and animals
- Found in meat and poultry products
- Grow on many food products
  - From cross-contamination
  - Sprouts, melons, other fresh produce
- *S. typhimurium* DT104 account for many human infections

Salmonella typhimurium DT104

- This serovar grows in many animals
- Resistant to multiple antibiotics – difficult to treat human cases
- Gastrointestinal tract of many species - humans, birds, reptiles
- Milk, beef, pork, poultry meat, sausage

Salmonella bacteria

Effects on animals :

- Cattle - diarrhea, decrease milk production, abortion. Death in cows and calves
- Recovered cows may become passive carriers.
- 75% of dairies found to have salmonella
- 6.3% of sampled feedlot cattle positive

Effects on humans :

- More severe symptoms, more deaths, difficult to treat
- 696,000 to 3,840,00 case per year with 0.1% mortality annually in US

Escherichia coli O157:H7

- O157:H7 is one of many strains of E. coli. A few are pathogens, most are not.
- This is the “hamburger E coli”.
- This bacteria causes disease in people by producing toxins as it grows after being eaten.

Escherichia coli O157:H7

- Effects on animals:
  - Insignificant clinical problems in cattle.
- Effects on humans:
  - Clinical signs - diarrhea, cramping, & vomiting, c) hemolytic uremic syndrome (HUS)
  - The most severe cases appear in young children most often.

Escherichia coli O157:H7

- Mode of transmission to people:
  - Eating undercooked hamburger and other meats
  - Eating contaminated veggies
  - Drinking raw milk and juices
  - Contaminated drinking water
  - Swimming in contaminated ponds
  - Daycare centers and nursing homes
  - Farm visits

Manure and Waste Water
(Potential for maintaining organisms on an affected farm)

- Survivors in Manure and Water include:
  - Many Salmonella species
  - Listeria, E. coli O157

Bacteria of Concern

- Many means of spread
- Comparison of carcass risk vs other risks?
- Water contamination
- Wildlife exposure

Risks from carcasses

- Bacteria
- Viruses/protozoa
- Fungal agents
- Prions
- Chemicals/toxins
- Bioterrorism?

Viruses of Concern

- Foreign disease viruses
- Cryptosporidia
- Giardia

Fungal Diseases of Concern

- Blastomycosis
- Cryptococcosis
- Coccidioidomycosis
- Aspergillosis

THE TSEs: MAD COW AND OTHER DISEASES

- A group of neurodegenerative disorders
- Unusually long incubation period
- Invariably fatal
- Caused by a novel agent
- Agent is extremely resistant

The TSEs of Animals

- Scrapie of sheep
- Transmissible Mink Encephalopathy
- Chronic Wasting Disease of Deer and Elk
- Bovine Spongiform Encephalopathy
- Zoological Garden TSEs in the UK
- Feline Spongiform Encephalopathy

Risk of Transmission

- CWD and scrapie are ‘robust’ – transfer readily within species
- BSE does not appear to transfer easily
- BSE requires extraordinary contact
- BSE prion can induce change in PrP of other species

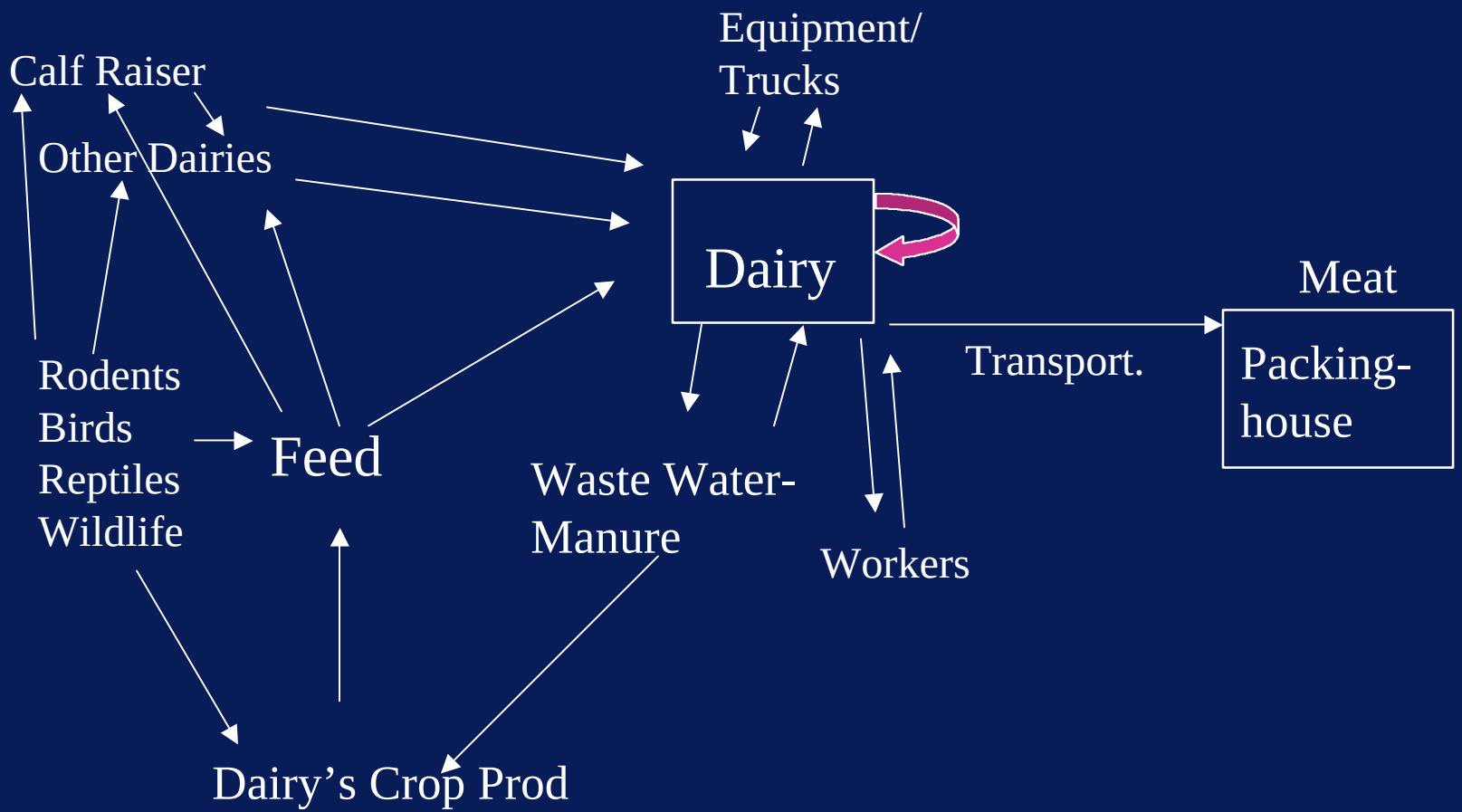
Risks from chemicals

- Euthanasia agents
  - pentobarbital
- Antimicrobials
- Pesticides
- Predator control compounds
  - 1080
  - strychnine

Assessing risks from carcasses

- Needed information
  - Prevalence
  - Geography
  - Population distribution and density
  - Disposal method/efficacy
  - Disposal method quality control
- Balance against costs
- Balance against other risks

Potential Points of Entry, and Movement of Bacteria in the Dairy Industry



Disease control

- Disease/problem identification
- Monitoring
- Record keeping
- Accurate Diagnosis – single most important component

Necropsy and Diagnostic evaluation Surveillance procedures